



King's Research Portal

DOI:

[10.1386/iscc.6.2.155_1](https://doi.org/10.1386/iscc.6.2.155_1)

Document Version

Peer reviewed version

[Link to publication record in King's Research Portal](#)

Citation for published version (APA):

Asmolov, G. (2015). Crowdsourcing and the folksonomy of emergency response: The construction of a mediated subject. *Interactions: Studies in Communication and Culture*, 6(2), 155-178.

https://doi.org/10.1386/iscc.6.2.155_1

Citing this paper

Please note that where the full-text provided on King's Research Portal is the Author Accepted Manuscript or Post-Print version this may differ from the final Published version. If citing, it is advised that you check and use the publisher's definitive version for pagination, volume/issue, and date of publication details. And where the final published version is provided on the Research Portal, if citing you are again advised to check the publisher's website for any subsequent corrections.

General rights

Copyright and moral rights for the publications made accessible in the Research Portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognize and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the Research Portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the Research Portal

Take down policy

If you believe that this document breaches copyright please contact librarypure@kcl.ac.uk providing details, and we will remove access to the work immediately and investigate your claim.

Crowdsourcing and the folksonomy of emergency response: The construction of a mediated subject

Gregory Asmolov
London School of Economics and Political Science

Abstract

This article explores the role of digital platforms in the involvement of citizens in disaster response, relying on an analysis of metadata and of the structure of classification. It adopts the analytical apparatus of Cultural-Historical Activity Theory (Vygotsky, Leontiev, Engeström) and the notion of governmentality (Foucault) in order to conduct a critical comparative analysis of how crowdsourcing platforms construct the relationship between citizens and disasters. The article identifies three regimes of classification (informing, alerting and engagement) and explores the structures of classification for mobilization of citizens' resources. The notion of governmentality allows us to identify the struggle around the structure of classification as a struggle between the institutional actors interested in controlling citizens' resources and those actors who are interested in citizen engagement and the synergy between independent and institutional actors as a part of the disaster response. The article suggests the notion of the folksonomy of activity, identifying situations where citizens are able to participate in the definition of their relationships with disaster through participating in classification. It also discusses the visibility of classification and the generativity of classification as a part of citizen–disaster (subject–object) relationships.

Keywords: emergency response; crowdsourcing; Activity Theory; Ushahidi; classification; folksonomy; governmentality

Suggested citation:

Asmolov, G. (2015), 'Crowdsourcing and the folksonomy of emergency response: The construction of a mediated subject', *Interactions: Studies in Communication & Culture*, 6: 2, pp. 155–178, doi: 10.1386/iscc.6.2.155_1

Introduction: Instrumental and critical research into Information Communication Technologies (ICTs) in disaster response

In recent years a significant body of literature discusses the contribution of ICTs to mobilization of volunteers in response to emergency situations. Among other issues, research has addressed how ICTs change the practices of gathering information about a disaster and distribution of information (Shklovski et al. 2010). The concept of participatory sensing (Goldman et al. 2009) suggests that citizens acquire new roles, not only as consumers but also as producers of information concerning a disaster. ICTs also support citizens' self-organization for emergency response, new modes of collaboration between formal institutions and informal organizations (St Denis et al. 2012; Crowley 2013).

Some of this research initiates a critical review of the role of ICTs in emergency response, for example, the monitoring and evaluation of their role in specific projects (Morrow et al. 2011) and an analysis of specific tools (Bailard et al. 2012). Most of the research exploring the role of ICTs in emergency response, however, can be described as

instrumental and administrative. It has focused on addressing policy and legal challenges, while suggesting ways of optimizing the use of ICTs as a part of the response to disasters. At the same time, there has been less focus on exploring the role of ICTs in the context of natural disasters, with a focus on power relationships.

According to Hewitt (1998), who applies the Foucauldian notion of governmentality to the study of disasters, emergency response can be analysed not only as an action driven by the motivation to save as many humans lives as possible, but also as an action driven by political concern to restore the specific sociopolitical order disrupted by the disaster. The disaster can also be approached as a catalyst of political change (Pelling and Dill 2010) and suggests an alternative sociopolitical order (Solnit 2010).

This article attempts to explore from a critical perspective the role of crowdsourcing platforms in involving citizens in emergency response. It seeks to address the research question of how digital platforms construct the role of potential responders in emergency situations. In order to respond to this question, it explores how crowdsourcing platforms mediate the subject (users)–object (disasters) relationship.

The article relies on an understanding of crowdsourcing as using digital platforms for mobilization of resources of individuals in order to achieve a particular goal (Asmolov 2014). This allows us to expand the definition of crowdsourcing beyond crowdsourcing platforms and to apply it to any digital tool, including mobile applications, blogs and social networks, that mediates the mobilization of digital users around a specific purpose.

In order to conduct a comparative analysis of the ways in which digital platforms are used to involve citizens in emergency response, this article suggests exploring how these platforms are used to mobilize the resources of crowds as part of a response to disaster. Accordingly, the research question concerns how crowdsourcing platforms structure the relationship between citizens, as potential resource-holders, and disasters, as objects that require resources' mobilization.

The article argues that responding to the research question requires an investigation of the metadata created around disaster response. The metadata in this case is the structure of classification of the disaster and any activities that can be related to the disaster. Investigation of metadata allows exploring the shift in power relations between traditional emergency-responders and citizens. The emergence of user-generated metadata means that users can take part not only in producing and sharing information with a wide public, but also in developing the structure of classification of this information.

Relying on Cultural-Historical Activity Theory (CHAT), the conceptual framework addresses the mobilization of resources as a tool-mediated and object-oriented activity to be investigated as part of the activity system (Engeström 1987). The framework is applied in order to conduct a comparative analysis of the structure of the relationship between citizens (subjects) and disasters (objects) as mediated through crowdsourcing platforms (digital tools). Following Hewitt (1998), the article suggests adopting a view of disaster response as a challenge for governmentality; accordingly, the structure of classification can be approached not only in a context of emergency response, but also as a way of controlling the behavior of citizens, victims and volunteers.

The analytical framework: Metadata as a discourse of mediated activity and the constitution of the subject – object relationship

In order to conceptualize the role of the digital platform in the relationship between the

citizens and the disaster, the article suggests that we rely on the notion of mediated activity developed by Vygotsky (1978) and his followers as a part of CHAT. This notion allows us to approach the involvement of citizens in emergency response, and in particular the mobilization of citizens' resources through digital platforms as a mediated activity that gives a rise to a particular type of activity system.

According to Vygotsky, any relationship of a subject (individual) with an environment (a world of objects) is mediated through psychological and material tools and then internalized in a human mind. The tools are developed as a part of a cultural-historical process, while 'the structure of the tool itself, as well as learning how to use a tool, changes the structure of human interaction with the world' (Kaptelinin and Nardi 2006: 56). Following Vygotsky, Leontiev (1978) extended the notion of mediated activity from the internal process of developing the higher mental functions to the external process of interaction between the individual and his surrounding environment:

For Leontiev, mediation is primarily understood as tool mediation, which transforms human interaction with the objective world as a whole. [...] Tool mediation shapes the entire structure of meaningful, purposeful activities. (Kaptelinin 2014: 208)

Engeström expanded Vygotsky's 'subject-tool-object' triangle into a model of the activity system as 'systems of collaborative human practice' (1988: 30). This model includes a few additional elements that are mediated as a part of the activity system: rules, community and the division of labour.

This allows Internet platforms for involving citizens in disaster response to be approached as tools that mediate the relationship between users and disasters. The tools can be associated with the development of different types of activity system in response to emergencies. The scope of this article is limited to one dimension of the activity system model, the relationship between subject and object.

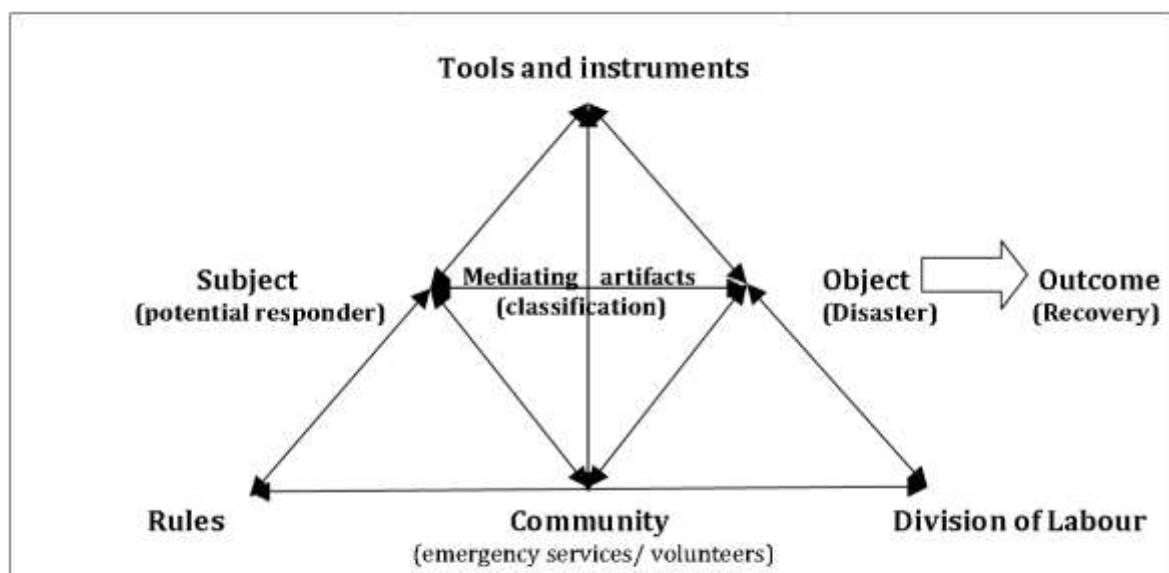


Figure 1: The structure of emergency response activity system based on human activity system model (Engeström 1987: 78)

However, Activity Theory neglects the analysis of power relationships. In order to incorporate the notion of power into the analysis of activity systems, this article suggests approaching tool-mediated activity as a discursive practice that constitutes the role of a subject in relation to an object. The *discourses of activity* are mediated through tools and

analysed within the frame of the Foucauldian notion of governmentality (Foucault 2009) as a 'governance of activity' and applied to the role of crowdsourcing platforms as a technology for the 'governance of the crowd'. The latter conceptualizes mediating artefacts as potentially a disciplinary technology that seeks to regulate the activity of citizens in order to restore the institutional order (Hewitt 1998).

To conclude, our conceptual framework suggests an investigation of citizens' involvement through understanding how digital tools mediate the role of citizens' involvement (i.e., the mobilization of the subject's resources) in emergency response through the governance of their activity. In order to operationalize how subject-object relations are mediated, this article suggests that we look into the structure of the metadata around the emergency and respond to the empirical question of how a particular digital artefact classifies the subject (citizen)-object (disaster) relationship.

The methodological framework: Metadata analysis and the folksonomies of activity

As mediating artefacts, digital tools embed a system of classification that defines the relationship between the user and the disaster. The units of metadata include, among other categories, tags (and hashtags), geolocation data and time. The structure of classification can be associated with the mediation of various forms of activity. Accordingly, the article focuses on an analysis of metadata as a tool's property that mediates the purpose (object) of the application of the crowd's resources.

The structure of the metadata around a disaster can be addressed as a 'taxonomy of activity', that is, the ways in which a particular classification mediates particular forms of activity. The relationship between subject and object is defined through the taxonomy of the disaster, that is, the classification of data around the disaster. The investigation of taxonomies allows us to address not only the content of categories, but also their visibility, as well as the process through which the metadata has been defined.

Durkheim emphasized that classification can be not only scientific, but also social in nature while people develop their own structures of categories in order to make sense of their surroundings (2001). Digital platforms and in particular Web 2.0 practices have allowed new forms of participation not only around the generation of data by users, but also the generation of metadata – the ways in which the data are described and structured.

Vander Wal coined the term folksonomy in order to conceptualize user's participation in the classification of information and defined it as 'the act of tagging by the person consuming the information' (2007). Additional definitions of 'people's taxonomy' approach it as an alternative to traditional hierarchical taxonomies (Trant 2009), emphasizing the bottom-up nature of classification. Pink addresses the democratization of classification and argues that 'the cumulative force of all the individual tags can produce a bottom-up, self-organized system for classifying mountains of digital material' (2005).

In addition, users can not only tag existing content but also create their own tags and categories to describe the data. Accordingly, a wider view of user participation in metadata definition requires that we take into account how tags are defined and by whom, as well as expanding the application of folksonomy beyond tags to other forms of metadata including categories and geolocation.

There are two more properties of classification that need to be taken into account. The first is the visibility of classification and the transparency of the process related to the development of the metadata structure. The second is the flexibility of the classification

structure. Lack of strict classification makes the mediated subject–object relationship vague and uncertain. In order to conceptualize the role of flexibility of classification in the mediation of subject–object relationships this article suggests applying the notion of generativity as *‘a system’s capacity to produce unanticipated change through unfiltered contributions from broad and varied audiences’* (Zittrain 2009: 70, original emphasis).

The purpose of analysing the metadata on emergency response platforms can be divided into four empirical sub-questions that address the structure of mediated artefacts as something associated with metadata: (1) What is the structure of the classification and the metadata and how does this differ from platform to platform? (2) What is the structure of the power relationship around the development of the metadata and what is the capacity of users (subjects) to make an impact on the structure of classification? (3) What is the degree of flexibility/strictness of the system of classification? (4) What is the degree of the visibility of the structure of classification?

Data and methods

The data set includes examples of platforms collected in 2013 as a part of fieldwork in Russia and Australia. The data include interviews with developers as well as digital data on classification structures. The two countries face similar types of disaster and have experience of using the same types of platform in order to address these. That said, they have different sociopolitical environments, which enriches the comparative analysis.

The first subset of data includes Australian mobile applications for emergency response. The second subset of data was drawn from Ushahidi deployments in Russia and Australia that addressed wildfires/bush fires. The third subset of data relates to a number of dedicated platforms that developed to engage volunteers in emergency response. The fourth subset addresses how traditional social media platforms (Livejournal, Twitter and Facebook) have been used for emergency response in Russia (floods in 2012) and Australia (floods in 2011). The last subset of data includes information about crisis mapping initiatives.

The data analysis is structured around five sections. The first of these is the classification regimes: informing, alerting, involving, which discusses more general strategies for the constitution of the role of citizens in a situation of disaster by means of an analysis of Australian mobile apps. The second involves a comparative study of two Ushahidi deployments, which allows us to discuss how the structure of classification mediates citizen–disaster relationships around resource mobilization. The third section conducts a comparative analysis of the mobilization of emergency-related volunteers in order to discuss the role of transparency and visibility in classification systems. The fourth section is focused on blogs, Twitter and Facebook in order to explore the role of bottom-up classification and generativity. The last section addresses crisis-mapping initiatives as a case where classification becomes an object of activity.

Data analysis

Classification regimes for citizens’ involvement

The first set of data analyses three emergency-related mobile applications used in Australia in response to disasters. The DisasterWatch mobile app was developed by the Australian

Emergency Management Institute. According to the official description, ‘the DisasterWatch phone app provides publicly available news and information about disaster events in Australia via direct feeds from a range of authoritative sources in the States and Territories and nationally’ (AEMI 2011). The application emphasizes that it does not provide any ‘direct emergency warning’, but only information about disasters.



Figure 2: Screenshots of ‘DisasterWatch’ mobile application.

The user needs to choose a particular state in Australia, or select the ‘Australia-wide’ option. Once the selection is made, the user can see a feed with updates from a particular region. A senior representative of the Emergency Management Institute pointed out that they ‘try to steer a path through – more towards news and information rather emergency alerts’ (Anon. 2013)

Applications that seek to alert users suggest a different type of classification.

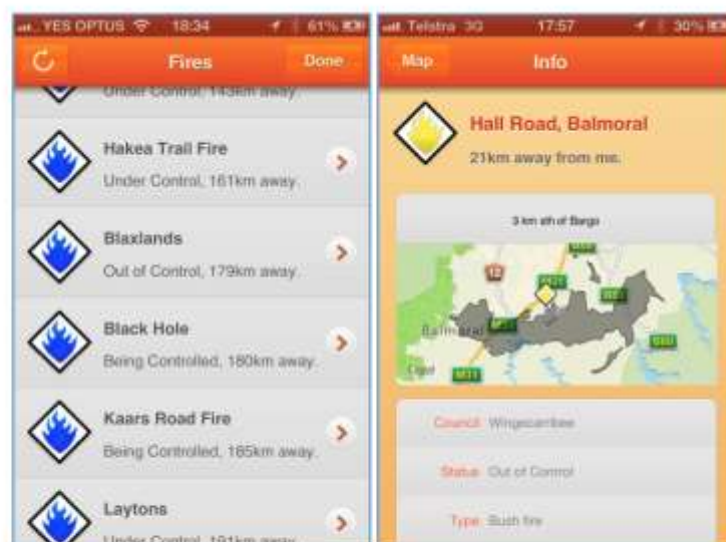


Figure 3: The classification of fires in ‘Fires Near Me’ mobile application.

The screenshots above are an example from the New South Wales fires in October 2013, as shown by the Fires Near Me mobile application developed by the New South Wales

Rural Fire Service. Unlike DisasterWatch, it seeks to classify information about bush fires in terms of the relationship between the location of the user and the location of the fire. The information is also classified in accordance with the degree of control over the fire by the emergency services (under control, being controlled, or out of control).¹

Emergency Aus is a mobile application developed as a start up by independent Australian developers and addressing the entire country in order to ‘bring together official emergency information from hundreds of sources, empowering its users to make better-informed decisions during emergencies’ (Australian Mobile Awards 2013). The application illustrates a number of classification elements that could also be seen in the previous examples, including the definition of watch zones and the distinction between ‘incidents’ and ‘warnings’. The *Emergency Aus* application, however, also has the additional classification scale of ‘observation’ messages submitted and shared by the users of the application.

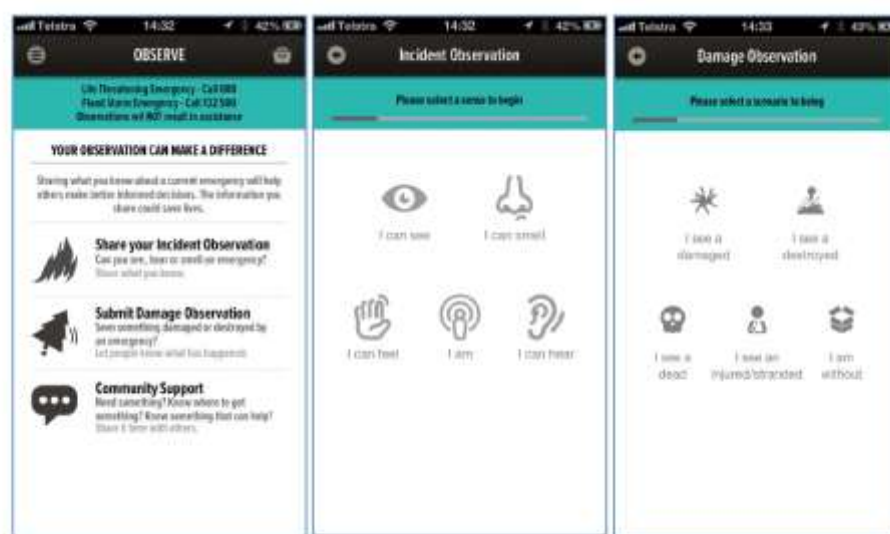


Figure 4: The classification of incidents in ‘Emergency Aus’ mobile application.

The classification relies on human sense perceptions. The user is asked to describe what a particular sense indicates (e.g., ‘I smell a fire’). The developers of the application explained: ‘Sensory observations are structured to mimic habits of social media users and are categorized by sense (I see, I feel, I hear, I smell)’ (Corbett 2013). By relying on individual human sense perceptions, the application provides a loose framework for the integration of both top-down reports relying on taxonomies and bottom-up citizens’ reports.

An additional set of ‘community support’ categories relates to various forms of involvement in emergency response that answer the question: ‘how can you assist?’ This includes the following categories: ‘I need’, ‘I have’, ‘I know where to get’, ‘I know where to donate’, and subcategories for specific needs.

¹ The Fire Ready app, which was developed by the Country Fire Authority in Victoria, differentiates between ‘incident alerts’ that seek to inform about something that has happened and ‘warning alerts’ distributed in a case of specific threats to people in specific zones.

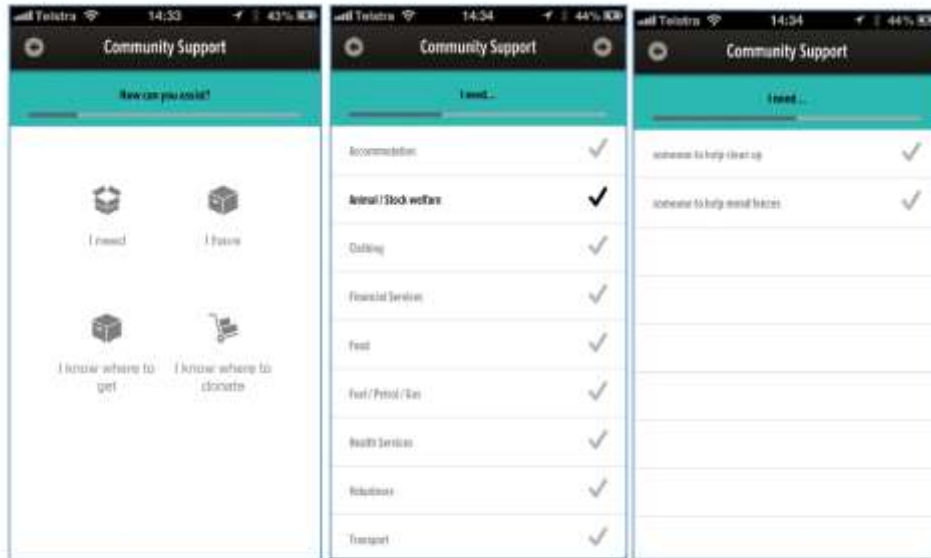


Figure 5: The classification of citizens' engagement in 'Emergency Aus' mobile application.

As illustrated in the images below, an additional sublayer allows for a description of the specific form of volunteer engagement required.

To conclude, we can identify three types of 'classification regime' that mediate subject-object relationships in substantially three different ways:

1. **Informing:** the purpose is to inform the general public about recent events. In this case the classification of data seeks to represent data in a convenient format for consumption. It is based largely on taxonomies defined by media organizations. The major purpose of informing is to make information an attractive product for the general public, but it has a limited utility for people in affected regions.
2. **Alerting:** the purpose of alerting is to let people know about events that may affect their lives. Alerting categorizes information around the degree of danger. Alerting addresses a bounded target audience that may be affected by a specific event. In most cases it relies on taxonomies defined by the emergency services.
3. **Engagement:** information represented in order to enable and facilitate a particular form of activity around this information. The purpose of classification is making engagement more coordinated around particular objects (such as disaster response).

Only the third type of classification, which constructs the subject as an active responder to disaster, can be associated with the mediation of a volunteer activity system. The first two forms of classification construct the subject either as a spectator or as a victim. The analysis above can be summarized as follows:

Type of classification	Community	Purpose	Structure of classification	Subject
Informing	Unbounded: general public	Providing general information/news	Urgency, within the structure of news websites	Spectator
Alerting	Bounded: people who may be affected by disaster	Providing essential information (activity limited to what is required for survival)	Specific location in relation to users, degree of threat, degree of control	Victim
Engagement (response)	Unbounded audience: people who can potentially be engaged in disaster response	Engagement in emergency response (mediated activity – disaster response)	Mapping specific needs, problems, resources	Volunteer

Table 1: Regimes of classification of emergencies and the construction of subject.

That said, the boundaries between informing, alerting and engagement are blurred. In some cases informing and alerting suggest a basic layer of situational awareness that is required for engagement, and different regimes can be found within the same platform.

Ushahidi platforms: Classification and forms of citizen involvement

Relying on an analysis of Ushahidi, this section seeks to demonstrate how different structures of classification mediate the mobilization of different resources of Internet users in emergency situations. This section provides a comparative analysis of the classification structure of two projects, ‘Bushfire Connect’ (Australia) and ‘Help Map’ for Russian Wildfires (Russia).

Ushahidi, a well-known crowdsourcing platform, was developed in Kenya in 2008. While Ushahidi started around a specific object, monitoring violence in Kenya, it was transformed into a generic platform that can be deployed for any purpose by any actor. The platform allows the submission of information by anyone around a particular subject, the aggregation of information from different sources and the visualization of information through a map.

There are a few characteristics of the metadata on an Ushahidi platform. First, all categories are visible. Second, every report should have a specific geolocation and appear on a map. Third, the categories and the boundaries of the map are defined by the deployers in every specific case.

The process of data collection cannot be separated from the classification of data. The categories are used not only to classify the information collected, but to provide a framework that defines what information should be submitted.



Figure 6: A screenshot of the front page of Bushfireconnect.org (2011)

‘Bushfire Connect’ is an Australian not-for-profit project for the collection and mapping of data about bush fires, launched by independent digital activists in May 2010. It was a response to the lessons of ‘Black Saturday’ in Victoria, when an investigation found that many people lost their lives because they had no real-time information about the fires. The platform has not addressed a specific disaster, but sought to provide a tool that can be used for monitoring, aggregation of data and mapping of bush fires in any area in Australia in a case of bush fires, relying on both official and citizen-based sources.

The platform was closed in 2012. The analysis relies on screenshots provided by one of the co-founders of the project. The default map of the deployment was the whole country (Van der Vlugt 2013). The structure of top-level categories included: All categories; ‘Preparation’; ‘Agency reports’ (‘Authorities’ in other versions); ‘Emergency’ (Road Closures, Evacuation Alerts, Fire Sightings); ‘Community Update/Updates’. The initial version also suggested layers of maps that would show ‘Hospitals’ and ‘Police Stations’. Later, a category of ‘Assistance’ was added.



Figure 7: A screenshot of the front page of Russian-fire.ru (2011)

The 'Help Map' for victims of wildfires was launched by a group of volunteers in July 2010 in response to wildfires in western Russia. A co-founder of the project, Alexey Sidorenko, said:

In light of chaotic overload of news and messages, the Help Map suggested an element of structure in the endless sea of information. The more substantial function was the function of coordination and connection of those who needed help and those who offered help. (2013)

The users of the platform could browse the needs of victims or the available resources of volunteers according to their own interests and location. Moderators facilitated the process in order to match the needs with the resources. The default map of the 'Help Map' included most of the territory of western Russia. The deployment included the following top-level categories:

ПРОБЛЕМНЫЕ СЛУЧАИ [+]	The nature of problem
ПОЖАРЫ	Fires
БЛОКИРОВАННЫЕ ДОРОГИ	Blocked Roads
ХОЧУ ПОМОЧЬ	Want to Help
ЦЕНТРЫ ПОМОЩИ / КООРДИНАТОРЫ	Centers of help/ coordinators
НУЖНА ПОМОЩЬ	Need Help
МЕСТА РАЗМЕЩЕНИЯ ЛЮДЕЙ	Locations for evacuation
ОТЧЕТЫ О ПОМОЩИ	Reports about help
ВОЛОНТЕРЫ "КАРТЫ"	Volunteers for the 'Map'
ПОМОЩЬ ПСИХОЛОГА	Psychological help
ПОМОЩЬ ЮРИСТА	Legal help
ВОЗРОЖДЕНИЕ ЛЕСА	Forest recovery
ЗЛОУПОТРЕБЛЕНИЯ	Violations
ВЫРУБКА ЛЕСА	Forrest cutting
ЗАГРЯЗНЕНИЕ ЛЕСА	Forest pollution
ГОСУДАРСТВО	State

Figure 8: The structure of the top-level categories for the 'Help Map'.

According to Sidorenko, the development of categories is the duty of moderators:

‘They need to understand if a specific category is stupid and needs reconsideration, or if it’s clever and addresses the reality’ (2013). A comparative analysis of the both projects allows us to identify substantial differences. The ‘Bushfire Connect’ project was not focused on a specific disaster or a specific region. The major purpose of ‘Bushfire Connect’, as derived from the structure of classification, is the long-term aggregation of information. While the project suggests opportunities for the engagement of Internet users around data collection and the mobilization of the sensor resources of users, the major purpose of crowdsourcing is mapping. Alongside citizen-based reports, a major role was played by the official sources. The ‘Agency reports’ category was created in order to aggregate information from various agencies. The structure of categories demonstrates that it did not mediate engagement in direct response to disaster.

The structure of classification for Russian-Fires.ru deployment has both segments – monitoring of fires and engagement in response/recovery. That said, it is evident that the categories that address engagement in direct response and recovery have more weight than the categories for mapping. In the case of the ‘Help Map’ we can also see some symmetry in the structure of classification, when the structure of ‘Need help’ is associated with ‘Help offered’, which makes these categories into a kind of matching algorithm. The categories address the type of resources needed more than the type of situation that requires a response, which makes this classification more generic (e.g., ‘People needed’ and not ‘Need volunteers for firefighting’).

To conclude, in the Australian project we can see that the role of the subject is a potential victim as a consumer of alerts, and a sensor, as a potential contributor of information. In the Russian deployment the structure of classification is focused on the mediation of activity around humanitarian aid, firefighting and recovery, and accordingly the mediated subject is not only a potential sensor, but also an active responder.

Transparency and visibility of classification in a platform for volunteer mobilization

The Ushahidi template puts categories in a central place on the platform. It exemplifies a specific tool with an open system of categories that can be customized by those who deploy the platform and revisited later. However, there are mediating tools where the categories are less specific, or less visible, or do not exist at all. This subchapter suggests a comparison of two platforms for citizen engagement in disaster response and discusses the visibility of the classification structure.



Figure 9: A screenshot of the front page of Emergencyvolunteering.com.au

The Emergency Volunteering platform was launched in Queensland by the NGO Volunteering Queensland. It was used during floods in the Brisbane area in 2011. The website suggests an entry point for those interested in joining a community of volunteers through completing a survey. The external side of the platform does not offer classification of activities or data collection, but only an opportunity to fill out the survey and a list of recent emergency events. The statement on the website says:

We operate year round, taking offers of volunteer assistance from everyday Queenslanders, registering and linking them to natural disaster response agencies when help is needed. [...] Volunteering Queensland saw the need for a coordinated registration and referral service to best manage the wide variety of volunteer skills, availabilities and locations. (Volunteering Qld 2013)

The website argues that the volunteers are engaged 'according to their skills and abilities' (e.g. medical, trade, counselling, IT), as well as 'equipment you can bring' (e.g. portable accommodation, chainsaw, generator, tools, machinery), and 'availability' (time frame, days, location) (Volunteering Qld 2013). The major structure of classification in this case addresses the skills and resources of volunteers, but this structure is not visible to users. The engagement relies on a restricted database collected through the platform. Decisions on how, for what purpose and when these resources can be used are not managed through the online tool, but made by specific individuals in the organization.



Figure 10: A screenshot of the front page of Floodaid.com.au

The citizen-based independent platform FloodAid, which has also been used in response to floods in Queensland (2011), is an example of a system that involves citizens by relying on an open classification. As it indicated on the image above, the platform declared that its purpose was ‘connecting those in need with those who can help’.

The structure of classification of the platform was focused around the symmetry of needs and resources: ‘There was a red side and a blue side, red was things that I need, blue was things that I had. So if I log on I can flip through categories and bits and pieces’ (Kaplen 2013). The symmetric structure of classification allowed horizontal matching of subjects (citizens with resources) and objects of activity (people who need help). All the activities were transparent, and relied on peer-to-peer communication and allocation of resources, without top-down involvement.

To conclude, the construction of a subject as a volunteer in case of FloodAid was not related to joining a community of volunteers, but to a decision by a specific user to satisfy a specific request. Unlike FloodAid, Emergency Volunteering does not offer an open system of classification, but collects information in a closed database of volunteer resources that can be activated in a top-down manner by the administrator.

Bottom-up and generative classification: The role of social media Platforms

So far this discussion has focused on platforms created specifically for emergency response. However, major social networking platforms, as well as blogging platforms, often play a major role in emergency response. Therefore, it is important to analyse whether any structure of classification can be found on these platforms in a case of emergency, and what these classifications contribute to the mediation of the relationship between users and disaster.

Twitter and the role of hashtags for activity mediation

In the case of Twitter the major classificatory tool is the hashtag. Hashtags allow the generation of an ongoing feed of information around a common denominator as well as a channel for conversation around this denominator.

At the time of the floods in Brisbane the hashtags #qldfloodsmap and #qldfloods became a major element in tweets about the disaster (for a more detailed analysis of the role of Twitter in the Queensland floods, see Bruns et al. 2012). According to social media manager at Brisbane City Council Tracy Whitelaw, 'Queensland Floods really started out as the hashtag that we were using, that everyone was using, not just the council' (2013). An additional popular hashtag that was promoted by the Queensland police service was #mythbuster, which was initiated in order to stop rumours. During the floods in Kuban in 2012 Twitter users used hashtags in Latin and in Cyrillic script, including: #krymsk; #крымск, #поможем and #pomozhem (will help). The functions of the hashtags can be summarized as following: location (or location+time), type of disaster (or type+location), activity (e.g. request for help) and function (e.g. #mythbuster).

A social media manager at Brisbane council used hashtags to channel the activity of spontaneous volunteers and mobilized their resources around a specific type of object, the cleanup operation:

The first thing we did was we created a hashtag called BN Cleanup. Anything that went out from us about any kind of volunteering or helping with anything that was going on, the hashtag would be #BNCleanup. (Whitelaw 2013)

According to Whitelaw, Brisbane City Council developed a Social Hub portal that allowed them to preprogramme specific hashtags in order to aggregate all information in one place (2013). There were also efforts by the Office for the Coordination of Humanitarian Affairs (OCHA) to introduce 'Hashtag standards for emergencies' (Verity 2014), in order to promote better collaboration between volunteers and traditional responders, which can be viewed as an effort to introduce a pre-planned classification structure into the social media.

Hashtags also allow the embedding of data in other emergency response platforms. For instance, one of the options for the submission of messages to the Ushahidi deployment suggests sending a tweet with specific hashtags. In this way hashtags were used as cross-platform metadata and contributed to the flow of information between platforms.

Facebook: No classification and the mediation of generative activity

In the majority of cases of natural disaster we can witness the appearance of dedicated groups on social networks.

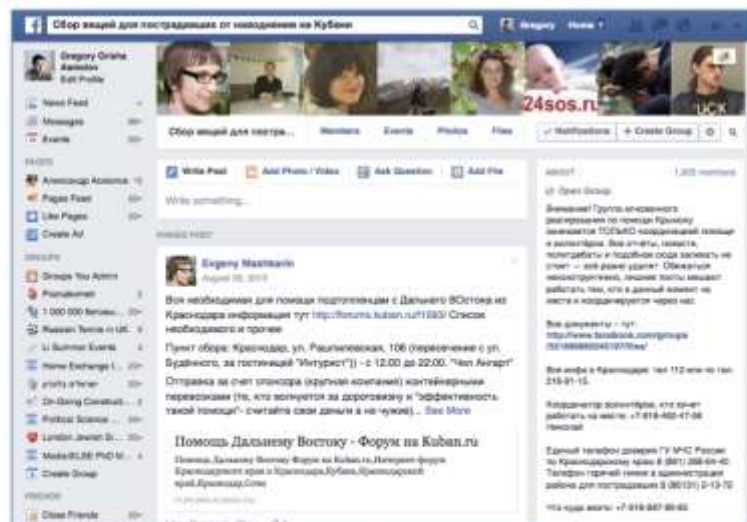


Figure 13: A screenshot of Facebook community 'Collecting goods for victims of the floods on Kuban' (<https://www.facebook.com/groups/331696890246197/>)

For instance, in the case of the 2012 floods a group called 'Collecting goods for victims of the floods on Kuban' was created by volunteers in Krasnodar, a city close to the disaster area. On the one hand, Facebook allows the development of an open community and suggests a horizontal infrastructure for communication to facilitate emergency response. On the other hand, it makes facilitation challenging. Facebook does not offer tools for tagging or classification (except chronologic order and hashtags, which were introduced in 2013).

The techniques that are used in order to address a lack of classification structure include the role of moderators, who orchestrate communication between the users and define the role of the group. In addition, in some cases we can see how moderators used external tools for classification. The moderators of the group created in Krasnodar used Facebook-based documents to create lists around different topics based on information from the group.

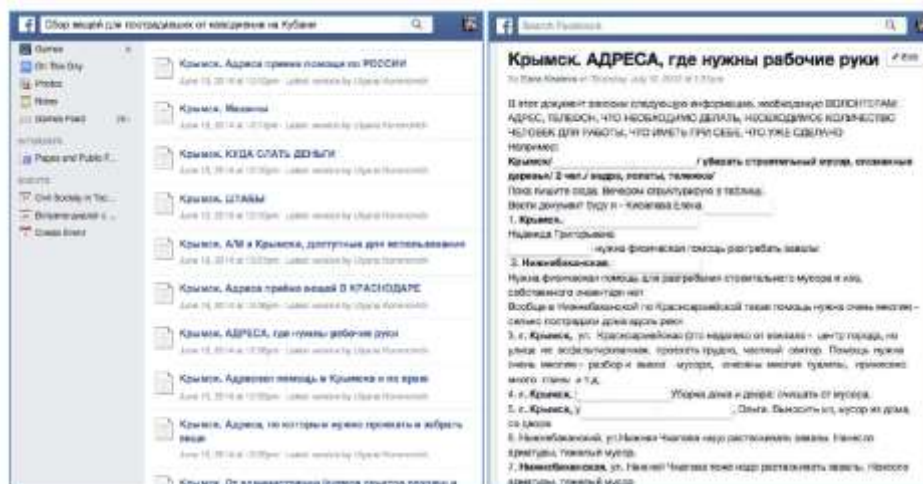


Figure 14: Facebook-based documents for classification of assistance to victims: List of the documents (on the left) and 'Addresses where working hands are needed' (on the right).

The screenshots above provide examples of documents used for the classification of information. The first image is a list of documents with a number of titles including 'Locations for collection of goods', 'Where to send money', 'Cars' etc. The second image is a document titled 'Addresses where working hands are needed', includes: address, phone number, form of help required, number of people required, equipment required, etc.

Generative activity and bottom-up classification

The social media platforms suggest two major properties. First, they rely mostly on folksonomies and user-driven classification. Second, the classification either does not play a major role or does not exist at all. The latter makes the platforms more open to various form of activity mediation and flexible with regard to how these platforms define the relationship between Internet users and disaster. This can be described as a high degree of generativity, which means that these platforms have more capacity to mediate the mobilization of unexpected resources and to suggest diverse forms of activity mediation.

In the case of Twitter, hashtags allow the mediation of activity around location, situations or specific needs. Accordingly, hashtags can play a part in the construction of the user–disaster relationship. However, we can see that hashtags are used more intensively by institutional actors to construct the subject of mediated activity. Local authorities and emergency response agencies introduce their taxonomies through the structure of classification of social media, in order to channel the activity of users towards a specific object.

Classification as activity

There are also cases where the structure of classification not only mediates activity, but is itself an activity. This happens when online users are asked to classify social-media-based information from a disaster area in order to support the situational awareness of responders. Projects like Tomnod (Tomnod.com) or Micromappers (Micromappers.wordpress.com) mobilize the analytical resources of Internet users.

The Micromappers project was activated in order to classify information about Typhoon Yolanda in the Philippines. The classification addressed a database of over a million tweets with 60 hashtags. The classification of images addressed the degree of damage, according to three categories: 'none', 'mild', or 'severe'. The classification of tweets included a number of categories e.g. 'Requests for Help/Needs', 'Infrastructure damage', 'Population displacement' (Meier 2013).

In the cases of Twitter and Micromappers we can see two layers of classification. First, tweets are classified by users, who write a tweet with a particular hashtag/s. Then, relying on hashtags, the tweets are collected and analysed according to a system of classification developed by those deploying the Micromappers platform (e.g. UN OCHA). In other words, the bottom-up folksonomy meets the top-down taxonomy that has been applied to the database by online volunteers whose analytical resources have been mobilized.

In this case, classification, has a double status. On the one hand it mediates the relationship between the subject (Internet users) and the object (disaster). On the other hand, classification itself as a process of data-mining is an object of activity that can be mediated through online tools. In the latter case, classification is one of the forms of relationship between Internet users and an emergency situation.

Analysis: The power of classification and the construction of the crowdsourcing subject

The analysis of the structure of classification demonstrates a broad range of various forms of relationship between users and disasters, from passive spectatorship to active engagement in response and recovery efforts. Digital tools mediate the mobilization of different citizen resources, from simple tasks that demand basic analytical skills (as in the case of micro-tasking) and the collection of data about the emergency to the provision of humanitarian efforts and active involvement in efforts on the ground.

Most institutional taxonomies tend to limit the disaster–citizens relationship to informing and alerting, while the forms of engagement are primarily related to the collection of data. At the same time, the classification structure found in some independent platforms suggests categories that mediate a broad range of activities in response to disaster, including direct response and humanitarian aid. The degree of generativity and flexibility of classification is higher in the case of independent projects, while projects affiliated with traditional institutions suggest more specific categories. In general, we find more categories offering citizen engagement in the recovery phase.

The purpose of a critical analysis was to explore how these platforms mediate the construction of the role of citizens, their mediated disaster-oriented activity, and in particular what citizen resources are mobilized through relying on digital tools. The analysis is informed by the notion of governmentality, which allows us to identify the tension between efforts to optimize resource allocation and the interest of institutional actors in controlling the resources of independent actors in order to protect the political order. Relying on data analysis, we can identify three modes of power relationships around the mediation of subject–object relationships.

Taxonomy-based activity systems

The categories are defined by institutional actors in a top-down manner and suggest specific, strict forms of citizen–disaster relationship. The interaction within the structure of classification is primarily top-down in nature. In some cases, such as that of the Emergency Volunteering portal, the structure of classification is concealed from users. Accordingly, the mediation of the activity of the subject is controlled and shaped by institutional actors, who define whether and how the resources of the subject are mobilized in response to the emergency. The systems for ‘informing’ and ‘alerting’ suggest a system of taxonomies that constructs the subject either as a passive spectator or as a potential victim. The systems for involvement also represent the institutional actors’ vision of how the citizen needs to be engaged, for example, as a sensor resource reporting on the emergency. We can also see some efforts to apply institutional taxonomies of disaster to the space of social media.

Folksonomy-based activity systems

These categories of response are defined by users or independent actors who are open to changing the categories in light of users’ demand. That said, platforms such as Ushahidi are often a field of struggle between top-down taxonomies and bottom-up folksonomies. While the Australian Ushahidi platform was more dominated by institutional categories, with a focus on disaster mapping, the Russian platform had a structure dominated by categories for citizen engagement that reflected the major forms Internet users’ activity in response to disaster. The space of hashtags becomes a contest between self-emerging and institutional forms of classification, while the bottom-up classification has also been reclassified within

taxonomies as a part of crisis mapper activities. In the case of Emergency Aus, the sensor-oriented classification allows an integration of institutional and citizen reports, without forcing a particular structure of classification. In the case of FloodAid the structure of classification is loose enough to accommodate various forms of activity. It allows citizens to have control over their form of involvement in disaster response.

Generative activity systems

These are platforms with no categories and a clear structure of classification, as in the case of Facebook. Accordingly, these platforms have a greater capacity to produce unanticipated forms of activity and a greater freedom for the subject to construct their form of involvement as he or she wishes. That said, we can see the efforts to regulate generative spaces through additional tools or moderation, in particular by institutional actors.

Combined activity systems and geographical metadata

The differentiation described above suggests an analytical value. The boundaries between various types of classification can be blurred. In some cases, we can identify different types of classification system within the same platform. The relationship between various systems of classification can vary from a struggle between taxonomies and folksonomies to 'peaceful' integration.

An additional factor that needs to be mentioned is the role of geographical metadata. The boundaries of the maps, as well as geolocation technologies, define the geographical boundaries of the activity system and the scope of engagement of citizens in emergency response, varying from only the citizens who present in a specific location to the engagement of a whole country or of the international community as a potential responder taking part in activity and contributing their resources through digital mediation. The notion of proximity to disaster is mediated differently by different systems of classification. For instance, if in a case of informing the location is usually described in general terms, in a case of alerting the classification of location defines the source of the threat and the ways of escape, and in a case of engagement the classification suggests specific actionable information that allows horizontal collaboration.

Conclusion

This article argues that the structure of classification should be analysed in a context of the power relationship between institutional and independent actors. Relying on the notion of governmentality, these relationships have been conceptualized as the governance of a crowd and its resources. Following this logic, the article has attempted to demonstrate how digital tools can construct the subject in an emergency situation. It suggests that crowdsourcing platforms can be approached as digital tools that mediate activity, while the classification structure defines the mode of citizens' involvement around the mobilization of specific resources. The analysis of the structure of classification in a context of subject-object relationships illustrates how a subject can play different roles, as a recipient of information, as a sensor that can provide information, or as a responder who contributes his or her resources.

This research focuses in particular on the shift in the balance of power due to new participatory opportunities enabled by digital technologies. The notion of a 'folksonomy of activity', as applied here to disaster response, suggests that users can participate in defining their own relationship with disasters (object) through participation in the development of a

classification framework and accordingly new forms of relationship between subject and object. That said, ICTs are also used by institutional actors in order to increase their capacity to control citizen resources. Analysing the role of metadata can identify the tension between efforts to control the crowd's resources and efforts to engage the crowd's resources in response to emergency.

Accordingly, the analysis of metadata can help to identify various modes of relationship between institutional structures, independent organizations and citizens. In some cases independent platforms can replicate institutional taxonomies, while in other cases platforms can include both institutional, top-down and independent, bottom-up segments of classification, which can contribute to synergy between institutional and citizen actors. The clash between systems of classification can be found in cases where independent platforms suggest their own folksonomy of disasters that construct the role of citizens in emergency response differently from how this is envisioned by institutional actors.

References

Anon. (2013), in person interview, Mount Macedon, Australia, 7 October.

Asmolov, Gregory (2014), 'Crowdsourcing as an activity system: Online platforms as mediating artifacts. A conceptual framework for the comparative analysis of crowdsourcing in emergencies', in M. Poblet, P. Noriega and E. Plaza (eds), *Proceedings of the Sintelnet WG5 Workshop on Crowd Intelligence: Foundations, Methods and Practices*, Barcelona, Spain, 8–9 January, pp. 24–43, <http://ceur-ws.org/Vol-1148/paper3.pdf>. Accessed 28 April 2015.

Australian Emergency Management Institute (AEMI) (2011), 'DisasterWatch phone app', <http://www.em.gov.au/Resources/Pages/DisasterWatchPhoneApp.aspx>. Accessed 14 January 2015.

Australian Mobile Awards (2013), 'EmergencyAUS', http://mobileawards.com.au/MA2013/entry_details.asp?ID=12281&Category_ID=5439. Accessed 23 December 2014.

Bailard, Catie, Baker, Rob, Hindman, Matt, Livingston, Steven and Meier, Patrick (2012), *Crowdglobe: Mapping the Maps – A Meta-Level Analysis of Ushahidi and Crowdmap*, Washington, DC: Internews Center for Innovation and Learning, https://irevolution.files.wordpress.com/2013/01/internews-wpcrowdglobe_web-1.pdf. Accessed 14 October 2014.

Bruns, Axel, Burgess, Jean, Crawford, Kate and Shaw, Frances (2012), '#qldfloods and @QPSMedia: Crisis communication on Twitter in the 2011 South East Queensland floods', Brisbane: ARC Centre of Excellence for Creative Industries and Innovation, <http://www.cci.edu.au/floodsreport.pdf>. Accessed 18 December 2014.

- Corbett, Luke (2013), in person interview, Melbourne, Australia, 8 October.
- Crowley, John (2013), *Connecting Grassroots and Government for Disaster Response*, Washington, DC: Commons Lab, Wilson Center, <http://ssrn.com/abstract=2478832>. Accessed 16 December 2014.
- Durkheim, Emile (2001), *Elementary Forms of the Religious Life*, Oxford: Oxford University Press.
- Engeström, Yrjo (1987), *Learning by Expanding: An Activity-Theoretical Approach to Developmental Research*, Helsinki: Orienta-Konsultit Oy.
- ____ (1988), 'How to do research on activity?', *Quarterly Newsletter of the Laboratory of Comparative Human Cognition*, 10:1, pp. 30–31.
- Foucault, Michel (2009), *Security, Territory, Population: Lectures at the Collège de France, 1977–78*, Basingstoke: Palgrave Macmillan.
- Goldman, Jeffrey, Shilton, Katie, Burke, Jeff, Estrin, Deborah, Hansen, Mark, Ramanathan, Nithya, Reddy, Sasank, Samanta, Vids, Srivastava, Mani and West, Ruth (2009), 'Participatory sensing: A citizen-powered approach to illuminating the patterns that shape our world', Washington, DC: Woodrow Wilson Center for International Scholars, http://www.mobilizingcs.org/wp-content/uploads/Participatory_Sensing.pdf. Accessed 22 November 2014.
- Hewitt, Kenneth (1998), 'Excluded perspectives in the social construction of disaster', in E. L. Quarantelli (ed.), *What is a Disaster?: Perspectives on the Question*, New York: Routledge, pp.75-91.
- Kaplen, Graeme (2013), in person interview, Brisbane, Australia, 18 October.
- Kaptelinin, Victor (2014), 'The mediational perspective on digital technology: Understanding the interplay between technology, mind and action', in S. Price, C. Jewitt and B. Brown (eds), *The Sage Handbook of Digital Technology Research*, London: Sage, pp. 203–17.
- Kaptelinin, Victor and Nardi, Bonnie A. (2006), *Acting with Technology: Activity Theory and Interaction design*, Cambridge, MA: MIT Press.
- Leontiev, Aleksey N. (1978), *Activity, Consciousness, and Personality*, Englewood Cliffs, NJ: Prentice Hall.
- Meier, Patrick (2013), 'Typhoon Yolanda: UN needs your help tagging crisis tweets for disaster response', iRevolution, <http://irevolution.net/2013/11/08/volunteer-typhoon-yolanda/>. Accessed 19 December 2014.
- Morrow, Nathan, Mock, Nancy, Papendieck, Adam and Kocmich, Nicholas (2011), 'Independent evaluation of the Ushahidi Haiti project', <http://www.urban->

response.org/resource/6000. Accessed 2 December 2014.

- Palen, Leysia and Liu, Sophia B. (2007), 'Citizen communications in crisis: Anticipating a future of ICT supported public participation', *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*, San Jose, CA, United States, 28 April–3 May, pp. 727–36, https://www.cs.colorado.edu/~palen/palen_papers/palen-crisis.pdf. Accessed 18 October 2014.
- Pelling, Mark and Dill, Kathleen (2010), 'Disaster politics: Tipping points for change in the adaptation of sociopolitical regimes', *Progress in Human Geography*, 34: 1, pp. 21–37.
- Peters, Isabella (2009), *Folksonomies. Indexing and Retrieval in Web 2.0*, Berlin: De Gruyter.
- Pink, Daniel H. (2005), 'Folksonomy', *New York Times*, 11 December, <http://www.nytimes.com/2005/12/11/magazine/11ideas1-21.html>. Accessed 26 November 2014.
- Shklovski, Irina, Burke, Moira, Kraut, Robert and Kiesler, Sara (2010), 'Technology adoption and use in the aftermath of hurricane Katrina in New Orleans', *American Behavioral Scientist*, 53: 8, pp. 1228–46.
- Sidorenko, Alexey (2013), in person interview, Moscow, Russia, 30 August.
- Solnit, Rebecca A. (2010), *Paradise Built in Hell: The Extraordinary Communities that Arise in Disaster*, New York: Penguin.
- St Denis, Lise A., Hughes, Amanda. L. and Palen, Leysia (2012), 'Trial by fire: The deployment of trusted digital volunteers in the 2011 Shadow Lake Fire', in L. Rothkrantz, J. Ristvej and Z. Franco (eds), *Proceedings of the 9th International ISCRAM Conference*, Vancouver, Canada, 22–25 April, pp. 1–10, <http://epic.cs.colorado.edu/wp-content/uploads/TrustedDigitalVolunteersStDenisHughesPalen.pdf>. Accessed 16 December 2014.
- Trant, Jennifer (2009), 'Studying social tagging and folksonomy: A review and framework', *Journal of Digital Information*, 10: 1, pp. 1–44, <https://journals.tdl.org/jodi/index.php/jodi/article/view/270/277>. Accessed 26 December 2014.
- Van der Vlugt, Martin (2013), in person interview, Sydney, Australia, 1 October.
- Vander Wal, Thomas (2007), 'Folksonomy coinage and definition', 2 February, <http://vanderwal.net/folksonomy.html>. Accessed 14 December 2014.
- Verity, Andrej (2014), 'Social media hashtag standards for emergencies', Verity Think, 5 November, <http://blog.veritythink.com/post/101794202784/social-media-hashtag-standards-in-emergencies>. Accessed 14 December 2014.

Volunteering Qld (2013), 'Emergency volunteering', <http://emergencyvolunteering.com.au>. Accessed 11 December 2014.

Vygotsky, Lev S. (1978), *Mind in Society: The Development of Higher Psychological Processes*, Cambridge, MA: Harvard University Press.

Whitelaw, Tracy (2013), in person interview, Brisbane, Australia, 16 October.

Zittrain, Jonathan (2009), *The Future of the Internet – and How to Stop it*, London: Penguin.

Contributor details

Gregory Asmolov is a Ph.D. candidate at Media and Communication Department at the London School of Economics and Political Science. His Ph.D. research investigates the role of digital networked technologies for state-citizen relationships in emergency situations (under supervision by Professor Robert Mansell). Gregory has an M.A. in Global Communication from George Washington University (Washington, DC) and B.A. in communications and international affairs from the Hebrew University (Jerusalem). Gregory served as a visiting lecturer at Media and Communication Department at the Higher School of Economics (Moscow) and at School of Communication at the Interdisciplinary Center in Herzliya (Israel). He has consulted on information technology and social media projects for The World Bank and Internews Network, and worked as a research assistant at the Berkman Center for Internet and Society, Harvard University. Gregory is a co-founder of Help Map, a crowdsourcing platform, which was used to coordinate assistance to victims of wildfires in Russia in 2010 and won a Russian National Internet Award for best project in the 'State and Society' category.

Contact:

Department of Media and Communications, London School of Economics and Political Science, Houghton Street, London WC2A 2AE, UK.

E-mail: g.asmolov@lse.ac.uk